AERODYNAMIC TEST FACILITY

The Naval Air Warfare Center Aircraft Division Aerodynamic Test Facility (NATF) facility was developed to provide a wind tunnel testing environment to conduct fundamental research, computational fluid dynamics (CFD) code validation, and project support work. The goal of the Aerodynamic Test Facility is to conduct high quality subsonic research to provide an understanding of complex flow fields, such as vortex dominated flows, unsteady, separated, three dimensional flows, and flow over complex bodies.

Aerodynamic Test Facility

Facility Description: The Naval Air Warfare Center Air Craft Division Aerodynamic Test Facility consists of an Eiffell (in-draft, open return) wind tunnel with a 4 ft wide, 4 ft high, and 8 ft long test section. The tunnel is powered by a 200 HP motor providing a maximum speed of 200 feet/second and a Reynolds number per foot up to 1.27x10 exp6.

Model in the test section can be supported by a strut or sting system. Force and moment data may be taken either with an external strain gage, 3-component platform balance or a series of internal strain gage 6-component sting balances.

Flow Diagnostics: Flow diagnostics such as model surface pressure and flow field conditions can be carried out with various techniques and equipment. Model surface pressures are measured by a PSI 8400 pressure scanning system. The PSI 8400 scanning system is capable of measuring 256 pressure taps. Flow field measurements over a model can incorporate several methods, such as flow visualization, Laser Doppler Velocimetery (LDV), and hot wire anemometry. quantitative flow field measurements can be made through the use of a TSI three component LDV, a TSI three component hot wire anemometer, and various types of pressure probes (Pitot, Pitot static, seven tube, etc.). The LDV system nonintrusively measures the flow field. Flow visualization tests can make use of several techniques. Surface flow visualization can make use of titanium dioxide oil, fluorescent oil, and tufts. Smoke flow visualization may be carried out by introducing propylene glycol vapor into the flow or using a smoke wire. A movable laser sheet enhances the use of smoke to assist in data interpretation. Photographic and/or video equipment is also available for recording data and configuration setups.

For more information contact the Aerodynamic Test Facility at the Naval Air Warfare Center Aircraft Division at Patuxent River, MD at 301-342-8548.